



# Ordnance Electronic Newsletter

Fellow Warriors! Enclosed is the second edition of the Ordnance E-Newsletter. I hope you had a chance to enjoy the holidays to some degree wherever you are on the battlefield. To those Lieutenants currently deployed we salute you and will continue to keep you in our thoughts and prayers.

Inside we have some articles from LTs who deployed to Iraq and Afghanistan. Additionally, I have included some convoy TTPs from units currently deployed. We know we are most vulnerable when conducting convoys with our thin-skinned vehicles so I have also included some techniques units are using to “harden” their vehicles and their designs for fabricating gun mounts. Understand that most of these modifications are not likely to be approved by TACOM (Tank-automotive and Armaments Command) but the combat commander has more latitude in a combat environment. Please review them but understand that just welding a bunch of steel siding to the sides/bottom of our vehicles without thought and analysis may increase the danger to our soldiers.

The Global War on Terrorism was brought home to me this past month as I lost a close friend who was KIA while attempting to render safe an IED (Improvised Explosive Device). Remember that you are guardians of freedom and the American way of life.

Warriors, continue to do great things out there – you make our Nation proud.

*“We sleep safe in our beds because rough men stand ready in the night to visit violence on those who would do us harm” George Orwell*

Go Ordnance!

*Captain (P) Brian Clarke is graduate of the University of New Hampshire. He has served an automotive/armament PL, assistant BN S2/3, Ammunition Supply Point Operations Officer, EOD Company Commander, OBC Instructor and is currently the Ordnance Personnel Proponency Officer. His military schooling includes Ordnance OBC, Combined Logistics Officer Advance Course, Combined Arms Service Staff School, Airborne School, Air Assault School, EOD School and Ranger School.*

## Platoon Leader in Afghanistan

I am currently the Direct Support Platoon Leader in Bravo Company, 10<sup>th</sup> Forward Support Battalion. We are located in Kandahar, Afghanistan and are supporting the 1<sup>st</sup> Brigade, now Task Force Warrior, of the 10<sup>th</sup> Mountain Division (Light Infantry) and almost all other units on Kandahar Air Field, from National Guard units to the Special Forces. Our Task Force is responsible for combat operations in the country, focusing on the southern half of Afghanistan. Our sister Brigade is in the northern part of the country training the Afghan National Army. There are only two Lieutenants in my company. The other LT is the Maintenance Control Officer and is also the acting Platoon Leader for 1<sup>st</sup> Platoon since it is not an authorized slot. That platoon is made up of the shop office, the Battalion's organizational maintenance, and headquarters personnel. My platoon has 53 soldiers and is made up of four sections: Automotive (includes Ground Support Equipment, Engineer Equipment, and Service and Recovery) Armament, Communication and Electronics, and Missile. These section's capabilities have been expanded due to attachments from the Main Support Battalion. My platoon has the capability to fix almost anything that they bring us. My unit is a vital part of the combat effectiveness of the Task Force and Kandahar Air Field. Combat arms and combat support units depend on us. As platoon leader you have the chance to throw on coveralls and work side by side with your soldiers. I greatly enjoy this and it is very interesting. I have a B.S. in Mechanical Engineering and now I can work on equipment similar to what I have designed or analyzed in the classroom.

Since we are a Forward Support Battalion, we believe strongly in the fix forward concept. There are about a dozen firebases or forward operating bases that the Task Force occupies. At a moments notice we send soldiers to these bases to fix all types of equipment. We go whenever called and also do routine missions to inspect and repair anything we can, or identify problems, order parts and return at a later date. These are small teams of about 5 soldiers led by a senior NCO. I have gotten the chance to go on a few as well as the OIC. Due to the terrain of our Area of Operations, we travel to these missions by helicopter. As a result we have to travel light and be able to offload the helicopter quickly at hostile bases. Mainly we use "tuffboxes" to carry Class IX push packages and tools. We do send soldiers with Special Forces sometimes who drive to their firebases. We have also sent a DS mechanic along with an organizational mechanic on long medical and humanitarian aid missions that our Battalion's Alpha and Charlie Companies participate in. We also have done recovery missions. They are limited since self-recovery by the unit is usually done or the vehicle is sling-loaded under a helicopter back to a base. We have picked up three vehicles that have hit mines.

Since we do not have an executive officer slot, I have many of the XO duties, mainly Company Motor Officer and TMDE Coordinator. Being the acting XO allows me to see what is going on in the whole company, which lets me lead my platoon better. Along with my Platoon Sergeant, we are responsible for the health, welfare, and training of all of our soldiers. I also spend some time in shop office preparing to be MCO. Without my Company and Battalion, the war would not be capable due to a failure in logistics.



***Go Ordnance!***

*BERNHARD T. KLAUS  
2LT, OD*

## **MAINTENANCE READY!**

77<sup>th</sup> Maintenance Company; 485<sup>th</sup> CSB  
FLB Dogwood, Iraq

The 77<sup>th</sup> Maintenance Company “Warpath’s” accomplishments during Operation Iraqi Freedom are a true testament to the various demands places on a Non-Divisional Maintenance unit during combat operations. Their flexibility and ability to balance mission requirements adapt to the situation and implement basic soldiering skills is an example of what a unit needs to be successful during a deployment.

When the company left Babenhausen Germany in early March few knew what to expect, but their company commander, CPT Greg Lueders, and First Sergeant Alfred O’Reilly never doubted the abilities of the soldiers. From the moment the rumors started to spread in early March to this very moment, the Warpath has been faced with multiple taskings, urgent timelines, and threatening situations. Each phase of the operation – Pre-deployment, Movement, Relocation, and Operations – involved unforeseeable challenges that the soldiers faced head on.

The countless hours spent readying the companies over 200 pieces of rolling stock were not in vain. Mandatory load-up, and Deployment Exercise put in place by LTC John MacGillis, the 485<sup>th</sup> Cops Support Battalion “WarLion” battalion commander – now lead by LTC Paul Brown – ensured the company would be ready for the fight. The TCAIMS unit movement tool facilitated the process of tracking equipment and preparing essential movement documents. In addition, the Pre-Deployment Process held at Babenhausen Germany guaranteed that the soldiers had their shots, and were physically and mentally fit for combat. The movement from Babenhausen through Antwerp, Belgium and into Kuwait went off without a hitch. A key player in the success of the deployment was SGT Richard McLoone. His

HAZMAT subject matter expertise was instrumental at the port.

Upon hitting the ground in Kuwait it was apparent that the attitude and mentality of the soldiers changed. We weren’t in Kansas anymore – it was time to put on the game face. The process of transferring all of the units equipment from Shuayba Port near Doha to Camp Pennsylvania took the participation of every soldier we had. In addition, when the war kicked off and the scud alerts began to mount, the leaders of the Warpath began to shine. Once we were staged at Pennsylvania, the next step was the border crossing into Iraq to provide the much-needed support to the war fighter.

Convoy operations into Iraq brought about many challenges. Preventive Maintenance Checks and Services identified critical faults which had to be corrected in order to make the trek north. The threat was real, and this author can give you an idea of how real the threat was. Our company was located in Forward Logistics Base Cedar about 120 miles inside the Iraqi border. We made frequent convoys back and forth to Doha, Kuwait to pick up Class I and IX and other needed supplies. On one occasion, we ran into a little trouble.

A tactic that the Iraqi people used to loot our convoys was to set roadblocks, stop convoys, and then overwhelm the convoy with their numbers. In addition, they would use a distracter consisting of one or more civilian vehicles that would jump in and out of your convoy while waving you on in their direction. This is exactly what happened to a convoy I was commanding.

On the way back to Cedar, in the border town of Safwan we came into contact with a vehicle swerving in and out of our convoy. As you

can imagine, this made us a little uneasy, but stopping the convoy was not an option at this point. To make things worse, it was getting dark. We continued on our route along MSR Tampa until I could see an obstruction about 200 meters head. I noticed that there were six vehicles blocking the road. Due to the brief I had received, I felt I knew the intent of the individuals performing the roadblock, and took no chances. We immediately turned our convoy around, and avoided contact, found an alternate route to MSR Tampa and continued our march north.

Our mission while in Cedar was to provide direct support maintenance to companies on and passing through the base camp. In addition, we were responsible for recovery missions along the major supply routes in our area. The entire time we were being told that Cedar was a temporary base for us because the real work was up north. First Lieutenant Chris Brown and MSG Darrold Harper were endowed with the task of setting up a temporary Maintenance Control Section. They had to balance mission support and force protection while making the facilities efficiently operational, yet flexible enough to jump when given the order to roll north. Not an easy task when you add up all the variables, but when the time came their success was evident.

On to Forward Logistics Base Dogwood. . Within four days of our arrival to Dogwood we were receiving customers. Headed by the newly

welcomed Supply System Technician CW2 Scarborough and the technical expert on the ground SSG Travell Brown, the over 26 ISU's filled with Class IX supplies were on the ground and ready for distribution. Looking back to the days before deployment, moving our warehouse in Babenhausen seemed impossible – but the soldiers of the SSA made it happen.

Inherent in relocation are the mayoral taskings that constantly nip at your workforce. Mortuary affairs teams, quick reaction forces, mass casualty teams, general force protection requirements, are just a few of the extra responsibilities that a unit has to comply with. Setting priorities, balancing mission support and force protection, and continually looking out for the welfare of our soldiers are the Warpath leaders main concern.

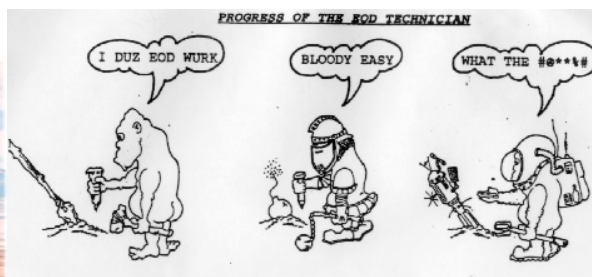
As of September 1, 2003 77<sup>th</sup> Maintenance Company has received 1065 jobs completing 946 of them – the backlog is due to parts not being received. Once the parts come in, the jobs go out. There is too much pride on the line to let a job sit on the maintenance floor. It's the soldiers that we have to thank, the ones underneath the trucks, in full battle-rattle on-point, putting their lives on the line as they escort mail and supplies. They have made great sacrifices to come here, and their dedication to their unit and their country is unparalleled. WARPAT!!

*1LT John F. Gavigan*

*Currently the Shop Officer/ Unit Movement Officer of the "Warpath"*

*Dedicating his time served during Operation Iraqi Freedom and Operation Enduring Freedom to Patrick Sullivan and his family. Pat was taken away from us during the tragedy of 9/11, and he is not forgotten*





## **EOD School Summary**

**By 2LT Jake Cool**

The school is consists of two phases and I have outlined what each phase consists of:

### Phase 1 - Redstone Arsenal in Huntsville, AL (10 weeks):

Course is designed to prepare students for the first division at Eglin AFB, FL. The Army's attrition rate at EOD school was high and this course was started to increase the success rate of Army soldiers. The class makeup ranges from captains out of the advanced course to privates attending their IET course. Weekends are off and no extra duties such as staff duty are assigned. From a LT's point of view, you are left alone only to concentrate on the course work. Average day consists of morning PT from 0530 to 0630 on Mondays, Wednesdays, and Fridays. Class everyday starts at 0820 to 1630. Study hall is from 1830 to 2030. Study hall is not mandatory BUT strongly encouraged because all of the course material must stay in the classroom because of its classification on Ordnance, RSPs, etc. The information is thrown at you fast and you need that time to sort it out and learn all the information. It's all worth the effort in the end because it sets you up for success at Eglin. The course is broken up as follows:

- 2 weeks Basic Electronics
- 2 weeks General EOD terms/ knowledge
- 2 weeks Ordnance Identification/safeties
- 1 week Introduction to Tools
- 3 days EOD Publication instruction
- 1 week Ordnance Reconnaissance techniques
- 1 week Field Training Exercise

### Phase – 2 - Eglin Air Force Base in Fort Walton Beach, FL (7 months):

The Navy is responsible for the course. The class makeup consists of Air Force Airmen attending their IET course, Marine Corps E5s, the Army class you finished at Redstone with, and various Navy sailors. The Navy sailors all come

from dive school and generally they have their own classes. The course is a different experience working with and being instructed by the various services. The mentality of the course is focused on the EOD community and not rivalries between services. Just like Redstone, the weekends are off and no extra duties are assigned. Average day consists of 0600 formation- Army accountability. Class runs from 0630 to 1500 and study hall from 1500 to 1800. There is no organized PT- pretty much on your own. The Army usually has an OPD once a month for all the officers. The course is broken up as follows:

**Core** – Foundation of instruction for school. Fuze functioning, Ord ID, Recon

**Demo** – Work with explosives, learn to set shots

**Tools & Methods** – Learn tools EOD techs use to render safe ordnance

**Biological/Chemical** – Basic Chem, learn Decon techniques

**Ground** – Learn RSP for Projectiles, Rockets, Landmines, Grenades

**Air I** – Learn RSP for Aircraft explosive hazards, Guided missiles

**Air II** – Learn RSP for Bombs, Dispensers & Payloads

**IEDs** – Learn to eliminate home-made bomb threats

**Nukes** – Basic Nukes

As a LT, there are basically only four places you can go once school is completed. You will generally be assigned as the BN S1, S4, or assistant S3 at one of the four EOD BNs (Ft. Lewis, Ft. Sam-Houston, Ft. Gillem, Ft. Dix). After serving on staff for 18 months, give or take, you will take command of an EOD company within that BN. Companies are very small (roughly 20 soldiers strong), so the community is a tight brotherhood. Granted you will not have a chance for platoon leader time, however you can draw from all the experiences and the advice from the captains and enlisted personnel in your class. The chance to work in this community is an opportunity of a lifetime and worth all the sacrifice and hard work required to get there.





**WANTED for ARMY "BOMB SQUAD"**  
**PFCs, SPCs (Any MOS)**  
**Ordnance 1LTs and NBQ CPTs**

**MUST HAVE:**

**PHYSICAL PROFILE 111121**  
**NORMAL COLOR VISION**  
**GM 105 SCORE**  
**SECRET CLEARANCE (INTERIM)**  
**QUALIFY FOR FINAL TOP SECRET**  
**ABILITY TO WEAR ALL PROTECTIVE GEAR**  
**INTERVIEW-EVALUATION BY AN EOD OFFICER**

# **Explosive Ordnance Disposal**

**DEFUSE DANGER (NO) INTERFER FOR EOD !**

**CONTACT YOUR LOCAL EOD COMPANY**

**OR CALL THE ORDNANCE PROGRAM AT 654-208-0000**

## Supporting the Engineers in OIF



I am a 2002 graduate of USMA who majored in American History with a Nuclear Engineer Track. I branched Ordnance was assigned to 1<sup>st</sup> Infantry Division, Germany. However, when I stepped off the plane in January in Frankfurt, I found out I was assigned to the 130<sup>th</sup> Engineer Brigade, 565<sup>th</sup> Engineer Battalion in Hanau, Germany. Then the fun began...

The 565<sup>th</sup> Engineer Bn originally consisted of a Headquarters and Headquarters Detachment, the 502<sup>nd</sup> Assault Float Bridge Company, 38<sup>th</sup> Medium-Girder Bridge Company, and the 320<sup>th</sup> Topographic Company, but September 15, 2003, the 38<sup>th</sup> deactivated and the 502<sup>nd</sup> became a multi-role bridge company (MRBC).

I, being the only Ordnance officer in the battalion, became the Battalion Maintenance Officer (BMO). After two weeks on the job, I deployed to beautiful Camp Virginia, Kuwait, followed by a very quick movement into Iraq. For the next couple of months I jumped forward, and in April, we finally settled in Tikrit, Iraq. Our unit put in the "Birthday Bridge" on April 28, 2003 and continued to pull boat patrols for the next few months. I've included a few photographs of the operation.

What do boat patrols and bridging operation mean for we Ordnance types? I spent the entire time in Iraq chasing repair parts in a supply system that was far from functional, but by June / July, we started to receive parts quickly through the Army supply system. Engineers have crazy equipment with even crazier specifications, and most of it requires local purchase, especially for the MK2 boats.

I'm currently in the middle of redeployment chaos. We put all of the Battalion's equipment back on the boat in Kuwait. I flew back to Hanau, Germany and went straight to the Unit Movement Officer (UMO) course, and next week I'm receiving all the Battalion's equipment at the port in Belgium. A few of the challenges ahead include getting all the equipment back into the Army Oil Analysis Program (AOAP) and Test, Measurement, and Diagnostic Equipment (TMDE) program at home station. We have 56 transporters, 2 SEEs, 2 Dozers and some other equipment that the unit

originally did not have on its property book. Also, we are in the middle of New Equipment Training (NET) mandated by TACOM.

I get promoted December 1, 2003 and to better my professional development I will be transferring to the 19<sup>th</sup> Maintenance Company in support of 5-7 ADA at the end of December. The 19<sup>th</sup> Maintenance Company mission statement is to deploy and provide direct support maintenance and class IX repair parts support to 5-7 ADA. There I will serve as the Maintenance Platoon Leader. Twelve months later, if all goes well, I will take over shop office.

That's life in the wonderful world of Engineering. Who said you had to branch detail to get all the fun? Send me an email if you have any questions. ([latrice.davis@us.army.mil](mailto:latrice.davis@us.army.mil)) Enjoy the holidays and **GO ORDNANCE!!**



*LT Davis inside BN TOC*



*565<sup>th</sup> Engineer BN HQs*

## Thoughts on Convoy Ops



I'm 1LT Jason Cucinotta and I am currently the Shop Officer for the 596th Maintenance Company from Darmstadt, Germany. We are under 3rd COSCOM, 16th CSG, 485th Corps Support Battalion and we are deployed in the Baghdad area in support of Operation Iraqi Freedom. I am sending you a convoy book that was written by our battalion S3 CPT Shaun Calvert (TC) and is the convoy bible for our unit. Maybe it will help with the convoy instruction part of OBC.

The biggest threat to our convoys are IED's, which are all over the news. The enemy likes to disable a vehicle near the end of a convoy to separate it from the main element, and then hit the disabled vehicle with small arms/RPG's. The gun trucks are the most important part of the convoy. They provide the "force protection" for the convoy and a maneuverable crew served weapon mounted on a vehicle. We don't go anywhere without a gun truck at the front and rear of each convoy.

Maintenance Companies usually don't have armor HMMWV's in their MTOE, so you need to harden the vehicles with sandbags and fabricate gun mounts in your S&R Shops. We used some metal tubing and U bolts to make small gun mounts for M249's which we bolted to the roof of a M998 or on the spare tire arm of a 5 ton cargo. Convoy operation are when we are most vulnerable, so it needs to be done right.

*1LT Jason Cucinotta*



## Thoughts on Vehicle Hardening

I am shop officer with the 407th FSB, 82d ABN DIV. I have been in theater since FEB 2003. I just wanted to give you my opinion on hardening vehicles. There are kevlar blankets that can be ordered for 998 Hummvee's, these are what I prefer. If you don't have access to these then sandbags are the best way to go. This is what we used when I was an MP in Somalia. Some units have fabricated steel doors and panels for the back of the 998's, but if hit with an IED this just creates more shrapnel to injure or kill the occupants. My MCS witnessed this in Desert Storm, when a Deuce 2 1/2 ton truck hit a small mine and everyone in the the back was killed or wounded. The steel people use isn't made to be armor and thus doesn't work in that fashion, even some small arms can penetrate it. There is a armor box that I have seen on some 998's here also, it has ports to fire from, I believe some SF units have it. I'm sorry but I don't have any NSN's for these items. Of the trucks that we have had hit here by IED's the sand bags only help a little but it depends on what size the IED is.

We just had an up-armor humvee ripped open by a huge IED. Two people did survive though severely injured. I guess my point is if you are hit with a smaller weapon hardening helps prevent more casualties, but if you hit something large enough to take out a tank there isn't much you can do. As for SOP's and PCI's we require a minimum of two vehicles with at least one CLS bag, two radios, smoke or a VS17 panel for marking your location in case you need a medivac. We also require a SAW per vehicle. The convoy commander also is given a list of units FREQ's near their route in case they are hit and need help. I hope this helps you.

*1LT Chris Gibson*



## HEMMT “Gun Box”

The box is designed to go into a HEMTT cab top on passenger side. Remove cab cover panel and install into existing boltholes. Installation takes approximately 1 hour.



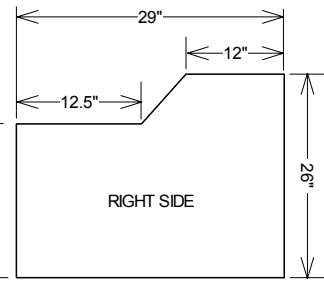
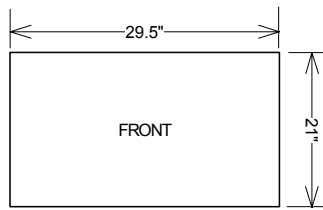
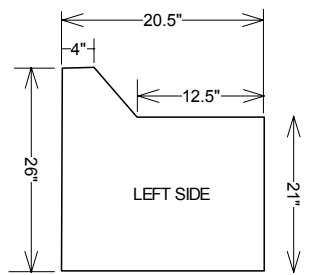
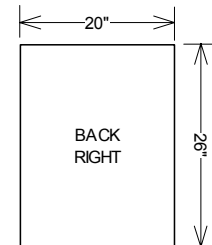
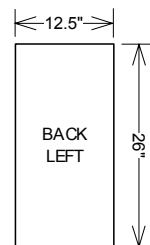
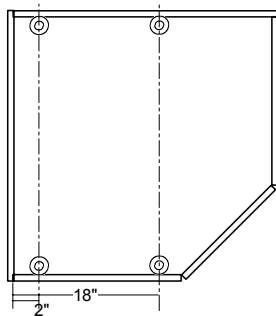
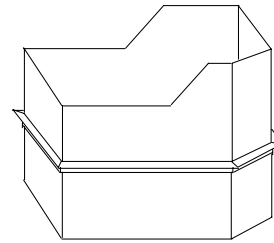
SAW can be removed quickly and the mount adjusts for left and right hand firers.

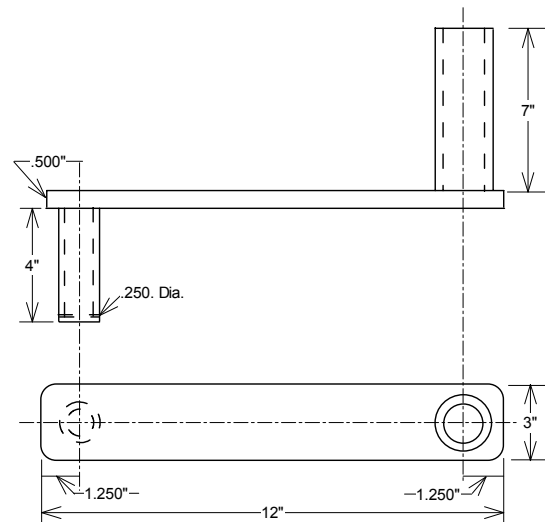
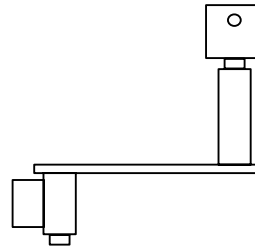


Operator has full field of fire, sling seat and eye bolt for personnel securing devices



The box is made of .375 armor plate and can withstand several small arms fire and other projectiles caused from explosive devices.

[illegible]



317th Maintenance Company  
Allied Trades Shop  
CW3 Norm May

[illegible]

## HMMWV Armor Plating

HMMWV armor sides made of 0.312-inch armor plate, NSN 9515-01-035-7730.

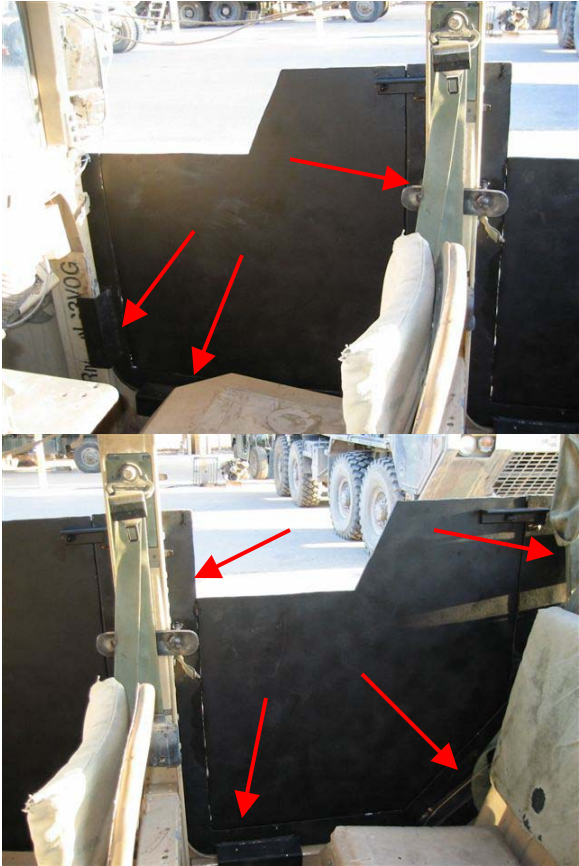


Armor plate is cut with plasma cutter to reduce unnecessary heat stress and effects. Mark body-panel with template as well as doors.





Weld hinges on doors and fabricate door latches. Armor sides attach at the following points on the HMMWV body. Use 308-16 welding electrodes for all welding NSN 3439-00-528-9063.



Note passenger side heater vent. The bottom two openings have been sealed with armor and the top attached with  $\frac{1}{2}$  round stock  $\frac{3}{4}$  inch long. Vent hole is a 7 inches diamond and the cover plate is 9 inches. Weld 2-inch x  $\frac{1}{8}$  metal strips for door assemblies.



2-door and 4-door systems.



Installation takes approximately 1 hour and does not modify vehicle in any manner. This system can be removed and installed as necessary.

*Norm May  
CW3, OD  
Allied Trades Technician  
Anaconda, Iraq*

## Info on “Vehicle Hardening” from TACOM

**From** ► [Wade Shepherd <wshepher@larnet1.ria.army.mil>](mailto:wshepher@larnet1.ria.army.mil)  
**Sent** Thursday, December 4, 2003 1:29 am  
**To** [wayne burton <wayne.burton@us.army.mil>](mailto:wayne.burton@us.army.mil)  
**Cc**  
**Bcc**  
**Subject** Fw: Standards for Ballistic protection material

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Info I received, thought you might like a copy

Ini

**Subject:** Standards for Ballistic protection material

Lots of folks in theater building gun trucks and adding armor to just about anything that moves. Most non approved by TACOM and probably never will be. The modifications are being directed at the local command level and basically commanders can do what is necessary for force protection. Disturbing thing is, I am seeing plain mild steel 1/4 or less being added as protection. Mild steel will not stop close range 7.62 x 39 AK 47 round and definately not the 7.62 x 39 AP. Also the plate is being added with no thought of spall liners on the inside of the plate. Those familiar with ballistics and armor know that when the bullet impacts thin armor plate, small particles of metal break off on the opposit side of the bullet impact. These particles become projectiles and can kill and wound even though there was no actual penetration of the armor.

We cannot sanction the modifications but if they are going to do it anyway lets give them some information / recomendations on material. This is a very informative outline on the NIJ (National Institute of Justice) ballistic protection standards, listing materials, thicknesses and Steel plate MIL standards. I recommend we get this information to the people ordering the material and doing the modifications. Many commercial sources are available on the web. If they are using anything less than what is identified in this information, and not using spall liners, they are giving the soldier a false sense of security and increasing risk of injury.

v/r

DONALD H. DENNIS  
TACOM LAR (Armt)  
TIKRIT IRAQ  
DSN 987-0565 ext 8430  
Com (732) 427-0565 ext 8430

- ARMORS -

Pinnacle Armor provides for a full selection of hard and soft armors and armor composites. In addition to the armors listed, Pinnacle Armor works closely with clients when certain armors are required for specific threats. These composites are not listed due to the nature of the design parameters and proprietary compositions. All ballistic armors have various explosive blast and forced entry resistance capabilities not listed, due to associated complexities. Armors are specified according to threats.

## BALLISTIC RESISTANT RIGID POLYETHYLENE PCR PANEL

Ballistic resistant polyethylene armor is manufactured from woven ECPE (extended chain polyethylene) fibers that are injected with either epoxies, silicones, urethanes, vinylesters or polyethylene resins, then placed in a hydraulic hot press or autoclave to form flat rigid sheets of opaque ballistic resistant armor. End use applications dictate type of injection and method of manufacture.

Ballistic resistant polyethylene armors are the lightest ballistic resistant opaque armor panels that current technology can produce. They are excellent for vehicle, vessel and all types of aircraft applications, due to lower weights, molding and shape forming capabilities. Ballistic resistant polyethylene armor will encapsulate the impacting projectile as it penetrates the various layers, thereby eliminating the typical ricochet that is inherent in hardened steel armors.



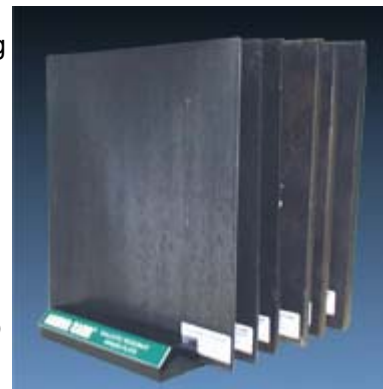
We offer five standard ballistic levels of protection in a rigid PCR panel configuration.

| THREAT LEVEL | NIJ I           | NIJ II-A        | NIJ II           | NIJ III-A        | NIJ III                |
|--------------|-----------------|-----------------|------------------|------------------|------------------------|
| WEIGHT       | 6.7 Oz./Sq. Ft. | 7.9 Oz./Sq. Ft. | 12.5 Oz./Sq. Ft. | 17.4 Oz./Sq. Ft. | 4 Lb. 12.4 Oz./Sq. Ft. |
| THICKNESS    | .1875"          | .2187"          | .2343"           | .2812"           | .750" - .8125"         |

## BALLISTIC RESISTANT STEEL ARMOR PLATE

Our ballistic grade steel is mostly compared to either Mil-A-46100 and/or Mil-A-46177 armor plate for its ballistic defeating properties and is used in a wide variety of armoring applications. Test plates from each heat lot of material are subjected to stringent ballistic testing before being qualified and approved for use.

The manufacturing facility for our ballistic grade steel is approved to Mil-I-45208A. Specified Mil-A-12560 CL.I., steel plate is also available, Mil-A-46100 steel is available up to 6" inches in nominal thickness. Mil-A-12560 CL.I., is available up to 22" inches in nominal thickness. Our ballistic grade steels are offered with variable toughness, hardness and workable chemical properties, dependent upon usage requirements.



Our standard MIL-A-46100 ballistic grade steels are offered in six basic levels of protection. Speciality grade high hardness and wrought homogenous steel are also available.

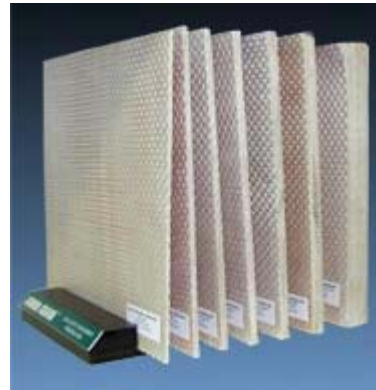
|              |                 |                  |                  |                   |                   |                   |
|--------------|-----------------|------------------|------------------|-------------------|-------------------|-------------------|
| THREAT LEVEL | NIJ III-A/UL-3  | SPECIAL          | NIJ III/UL-4     | UL5 & 8           | UL7 & 8           | NIJ IV            |
| WEIGHT       | 4.8 Lb./Sq. Ft. | 7.66 Lb./Sq. Ft. | 10.2 Lb./Sq. Ft. | 12.76 Lb./Sq. Ft. | 15.31 Lb./Sq. Ft. | 20.42 Lb./Sq. Ft. |
| THICKNESS    | .1181"          | .1875"           | .250"            | .3125"            | .375"             | .500"             |

## BALLISTIC RESISTANT FIBERGLASS PANEL

Ballistic resistant fiberglass armor is manufactured from two specific types of starch-oil woven ballistic E grade fiberglass cloth that is injected with a polyester resin, then placed in a hydraulic hot press to form flat rigid sheets of opaque ballistic resistant armor.



[Click photo to view close up](#)



The use of the more expensive starch-oil fiber permits thinner finished opaque armor sheets, resulting in lighter weights for every protection level tested. Quality control is maintained by providing single user manufacturing, eliminating any possible use of inferior grade cloths or excessive resin accumulations. Ballistic resistance fiberglass panels offer shear and structural strengths, combined with sustained multiple impact capabilities. Ballistic resistant fiberglass armor is designed to encapsulate the impacting projectile through controlled delamination and energy absorption, thereby eliminating the typical ricochet that is inherent in hardened steel armors.

S2 grade fiberglass armor is also available where exceptional increased strengths over E glass and other aramid fabric armors are required such as impact resistance, stiffness, tensile strength, temperature resistance, fatigue resistance and radar transparency.

**We offer the thinnest and lightest opaque fiberglass armor in eight threat level configurations.**

|                    |       |        |              |            |               |         |                 |         |
|--------------------|-------|--------|--------------|------------|---------------|---------|-----------------|---------|
| THREAT LEVEL       | NIJ I | UL I   | NIJ II-A/UL2 | NIJ II/UL6 | NIJ III-A/UL3 | SPECIAL | NIJ III/UL4,5,7 | UL8     |
| WEIGHT Lb./Sq. Ft. | 1.2   | 2.0    | 2.4          | 3.0        | 4.0           | 5.5     | 12.0            | 13.4    |
| THICKNESS          | .125" | .1875" | .250"        | .3125"     | .4375"        | .5625"  | 1.1875"         | 1.3125" |

## BALLISTIC RESISTANT WOVEN RIGID ARAMID PANEL

Pinnacle Armor offers all types of aramid fabrics for rigid hard armors meeting often diverse and specialized threats. Ballistic resistant rigid aramid armor panels are structurally strong and offer shear resistance. Rigid aramid panels are manufactured by layering multiple plies of woven fabric sheets with various elastomers, thermoset, phenolic or thermoplastic resins to form highly strong and dense impact absorbing sheets capable of defeating numerous attacks. Ballistic resistant rigid aramid armor is designed to encapsulate the impacting projectile through controlled delamination and energy absorption, thereby eliminating the typical ricochet that is inherent in hardened steel armors.



Specified fragmentation resistant rigid panels are available to meet the MIL-C-44050A standard or other required threats.

**We offer four light weight rigid aramid ballistic resistant panel configurations.**

| THREAT LEVEL | NIJ II-A        | NIJ II          | NIJ III-A        | Special III-A+   |
|--------------|-----------------|-----------------|------------------|------------------|
| WEIGHT       | .72 Lb./Sq. Ft. | .86 Lb./Sq. Ft. | 1.10 Lb./Sq. Ft. | 1.20 Lb./Sq. Ft. |
| THICKNESS    | .180"           | .190"           | .212"            | .245"            |

## BALLISTIC RESISTANT WOVEN SOFT ARAMID FABRIC PANELS

Pinnacle Armor offers all types of aramid fabrics for soft armors meeting numerous specialized threats from ballistics, thrust resistance, fragmentation to limited explosive blast resistance. Ballistic resistant woven aramid soft armor is manufactured by layering multiple plies or woven fabric sheets with a diamond quilting, that eliminates "puffing up" of the soft ballistic fabric resulting from multiple shots impacting at multiple angles and through varied quantities of uninterrupted impacted shots.

One type of ballistic resistant soft armor aramid fabric is comprised from extremely high denier yarn (1000 filaments per strand as compared to 840 standard), that when woven with an appropriate yarn count in a plain weave, consistently produces the highest V-50 testing results of all aramid ballistic resistant fabrics. This exceptional performance can exceed the polyethylene LCR fabric by 4.5%, yet still maintain breathability combined with unequalled flexibility. Specified fragmentation resistant rigid panels are available to meet the MIL-C-44050A standard or other required threats.



**Our standard ballistic grade soft aramid panels are offered in two configurations. Speciality applications with hybridization are available. Panel sizes and shapes are practically unrestricted.**

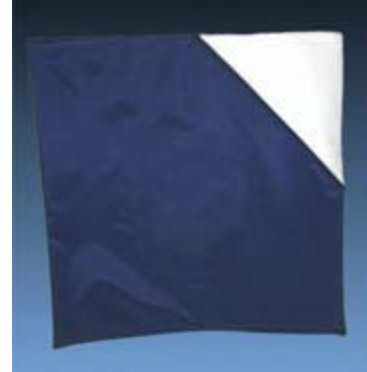
| THREAT LEVEL | NIJ II-A         | NIJ III          | NIJ IIIA         |
|--------------|------------------|------------------|------------------|
| WEIGHT       | 11.8 Oz./Sq. Ft. | 16.0 Oz./Sq. Ft. | 19.6 Oz./Sq. Ft. |
| THICKNESS    | .186"            | .242"            | .280"            |

| THREAT LEVEL | NIJ II-A         | NIJ II           | NIJ III-A      |
|--------------|------------------|------------------|----------------|
| WEIGHT       | 11.2 Oz./Sq. Ft. | 14.4 Oz./Sq. Ft. | 16 Oz./Sq. Ft. |
| THICKNESS    | .196"            | .252"            | .280"          |

## BALLISTIC RESISTANT SOFT POLYETHYLENE LCR FABRIC PANELS

Ballistic resistant polyethylene LCR soft armor is manufactured by layering multiple plies of polyethylene fabric sheets within a moisture resistant nylon rip-stop carrier, that reduces the "puffing up" of the soft ballistic fabric resulting from multiple shots impacting at multiple angles and through varied quantities of impacted shots.

Ballistic resistant polyethylene LCR soft armor is comprised from fibers that are laid down into unidirectional tapes. Two layers of the tape are then cross-plyed at right angles (0°/90°) and fused into a composite structure between two polyethylene sheets under heat and pressure. This produces an extremely light weight, soft and flexible opaque fabric armor that dissipates impact energy with water and chemical resistance.



Our standard ballistic grade soft polyethylene LCR panels are offered in two configurations. Speciality applications with hybridization are available. Panel sizes and shapes are practically unrestricted.

| THREAT LEVEL | NIJ II-A         | NIJ II           | NIJ III-A      |
|--------------|------------------|------------------|----------------|
| WEIGHT       | 12.4 Oz./Sq. Ft. | 13.1 Oz./Sq. Ft. | 16 Oz./Sq. Ft. |
| THICKNESS    | .231"            | .245"            | .300"          |

| THREAT LEVEL | NIJ II-A         | NIJ II           | NIJ III-A      |
|--------------|------------------|------------------|----------------|
| WEIGHT       | 10.4 Oz./Sq. Ft. | 12.8 Oz./Sq. Ft. | 16 Oz./Sq. Ft. |
| THICKNESS    | .140"            | .176"            | .224"          |

## BALLISTIC RESISTANT ALUMINUM ARMOR PLATE

Our ballistic grade aluminum armor is a military standard MIL-A-46063 heat treated aluminum armor plate designed for its ballistic properties and is used in a wide variety of armoring applications. Test plates from each lot of material are subjected to stringent ballistic testing before being qualified and approved for use.

The manufacturing facility for our ballistic grade aluminum armor is approved MIL-I-45208A. Specified MIL-A-46027 aluminum plate is also available, where weldability is of critical importance.

Our standard ballistic grade aluminum plate is offered in two configurations. One configuration

provides for weldability and formability. The other offers thinner non-workable flat plate solutions.

| THREAT LEVEL | NIJ III-A         | NIJ III        | NIJ IV         |
|--------------|-------------------|----------------|----------------|
| WEIGHT       | 12.25 Lb./Sq. Ft. | 14 Lb./Sq. Ft. | 19 Lb./Sq. Ft. |
| THICKNESS    | .875"             | 1.00"          | 1.375"         |

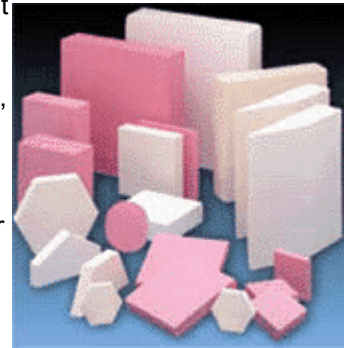
  

| THREAT LEVEL | NIJ III-A        | NIJ III          | NIJ IV           |
|--------------|------------------|------------------|------------------|
| WEIGHT       | 10.1 Lb./Sq. Ft. | 11.5 Lb./Sq. Ft. | 19.6 Lb./Sq. Ft. |
| THICKNESS    | .750"            | .850"            | 1.20"            |

## BALLISTIC RESISTANT CERAMICS

Our ballistic grade ceramics are offered in three ranges of materials: Silicates, Oxides and Nitrides, offering lighter weight options for ballistic capabilities than metals for armor. Ceramics are very hard and are therefore capable of dissipating projectiles. Ceramics work well in composite forms, and can be durable within extreme temperature ranges that often affect other armors.

We currently offer multiple types of ballistic grade ceramics for body armor and other armor configurations. Ceramic composite armor reduces weight and can be utilized to aid in the flexibility of armor configurations. Other capabilities of the ballistic grade ceramics are corrosion resistance to various types of chemicals, abrasion and wear resistance, non-toxicity, and heat resistance.



| THREAT CATEGORIES FOR ALUMINA, SILICONE CARBIDE & BORON CARBIDE CERAMICS |  |  |                                      |                       |
|--|--|--|--------------------------------------|-----------------------|
| 14.5 mm Caliber Military Rifles and Machine Special Handgun Rounds       | 14.5 Soviet Machine Gun Chinese type 75-1 Machine Gun Soviet PTRS & PTRD Anti-Tank Sub-Machine Guns, revolvers & pistols | CALIBERS   | AMMUNITION DESCRIPTION               | THREAT CLASSIFICATION |
|  |  | 14.5 x 114 mm<br>7.62 Tokarov<br>9 mm Pistol / SMC | API (B32)<br>Super penetrating and   | THREAT SPECIFIC III A |
| Assault Rifles & Light Support Weapons                                   | AK 47<br>M16 / AR15 etc  | 5.45 x 39.5 mm<br>5.56 x 45 mm                     | All ball rounds incl. steel core. AP | THREAT SPECIFIC       |
| 7.62 mm Caliber Military   | 7.62 NATO rifle and GMPG .30-06 Garand   | 7.62 x 51 mm<br>7.62 x 63 mm                       | Ball rounds incl. ones               | NIJ III               |
| 7.62 mm Caliber Military   | 7.62 Nato rifle & GMPG .30-06 Garand   | 7.62 x 51 mm<br>7.62 x 63 mm                       | Steel & Tungsten cored AP types      | NIJ IV                |
| .50 Caliber Military   | .50 Browning Machine Gun   | 12.7 x 99 mm                                       | AP or API                            | THREAT                |

|   |  |               |           |                    |
|---|--|---------------|-----------|--------------------|
| Rifles and Machine Guns                                   | 12.7 Soviet Machine Gun<br>Anti-Material Rifles  | (0.5")        |           | SPECIFIC           |
| 14.5 mm Caliber<br>Military<br>Rifles and Machine<br>Guns | 14.5 Soviet Machine Gun<br>Chinese type 75-1 Machine Gun<br>Soviet PTRS & PTRD Anti-Tank<br>Rifles | 14.5 x 114 mm | API (B32) | THREAT<br>SPECIFIC |

## BALLISTIC RESISTANT COMPOSITES

Ballistic grade composite armors provide levels of protection not available in standard armor configurations due to weight, nominal thickness, rigidity, flexibility, chemical, flame or other resistances. Composite armors provide protection against higher ballistic threat levels and also explosive blast and forced entry threats.

Our standard composite armor is provided in two configurations. Each configuration can be selected as rigid or semi-flexible.

| THREAT LEVEL | SPECIAL         | NIJ III         |
|--------------|-----------------|-----------------|
| WEIGHT       | 7.0 Lb./Sq. Ft. | 8.7 Lb./Sq. Ft. |
| THICKNESS    | .909"           | .909"           |

| THREAT LEVEL | SPECIAL        | NIJ III         | NIJ IV          |
|--------------|----------------|-----------------|-----------------|
| WEIGHT       | 5.2Lb./Sq. Ft. | 7.0 Lb./Sq. Ft. | 8.7 Lb./Sq. Ft. |
| THICKNESS    | .875"          | .909"           | .909"           |

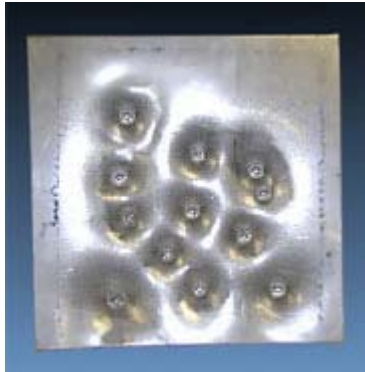
PATENT NUMBER 6,510,777

## BALLISTIC RESISTANT EXOTIC METALS

Other ballistic grade exotic metals offer lighter weight options to steel and nominal thickness reductions to that of aluminum, and offer multiple sustained hit capabilities over ceramics without structural durability loss. Exotic metals offer a combination of hardness and toughness without the nominal thickness or weights of conventional hard armors. Our ballistic grade exotic metals such as titanium and other highly modified alloy steels offer greater threat resistance versatility through metallurgical manipulation.

### NIJ Level III-A Special Ballistic Grade Steel

[Click photos to view close up](#)



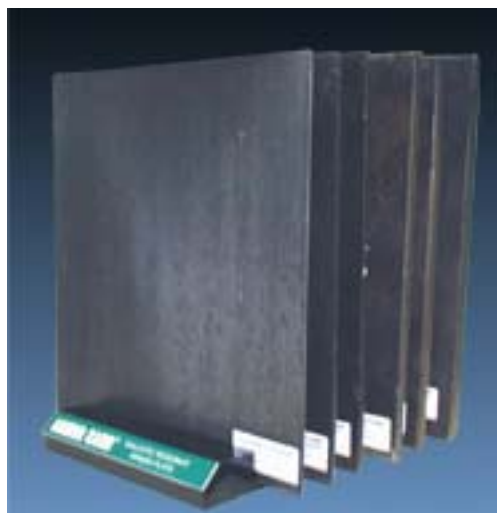
Front impact face, steel modified for high corrosion resistance.



Back protected side, steel also modified for multiple repeat hit resistance through ductility.

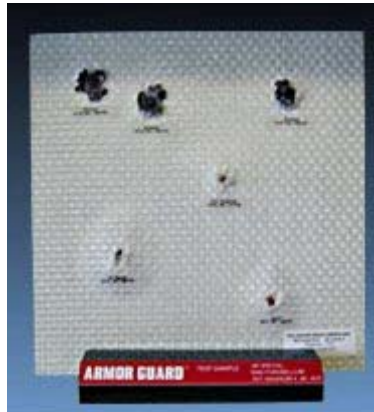


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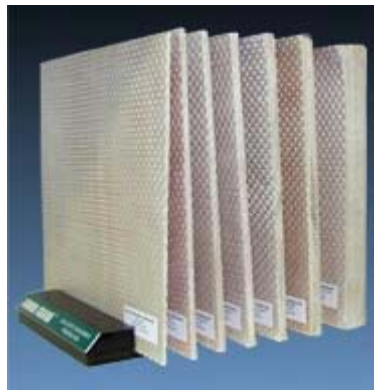
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**File:** fiberglass.jpg

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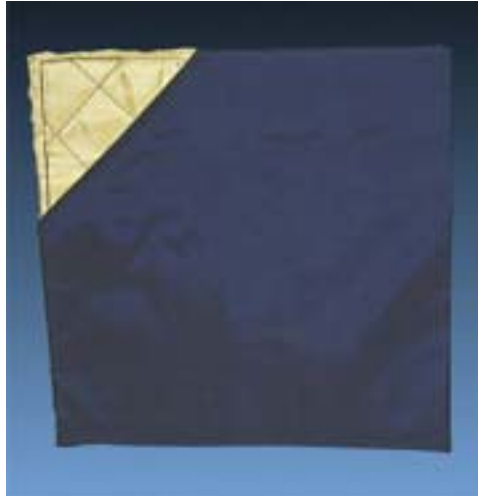
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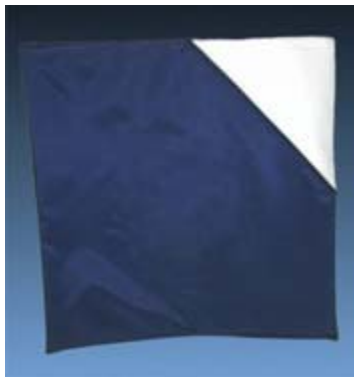
**File:** aramid2.jpg

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**File:** soft\_aramid.jpg

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**File:** LCR\_panel.jpg

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**File:** armor\_2.gif

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**File:** metal\_front1.jpg

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**File:** metal\_back\_angle.jpg

## Powerpoint Presentation on Ballistic Protection



Ballistic Protective  
Blankets.ppt

*courtesy of LT Havner 63<sup>rd</sup> Ord BN (EOD)*